

DEVELOPMENT OF MUSCLE STRENGTH IN STUDENTS: STRATEGIES FOR INDEPENDENT CLASSES

DESENVOLVIMENTO DA FORÇA MUSCULAR DOS ALUNOS: ESTRATÉGIAS PARA AULAS AUTÓNOMAS

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ABSTRACT

Optimizing the process of physical education as a specialized, purposeful, managerial pedagogical activity requires the search for new approaches to the physical activity of students of higher educational institutions of Ukraine. Recently their level of health and physical fitness is a cause for concern. The impossibility of fulfilling the control and module standards according to the program with of physical education for a positive assessment reduces students' motivation for classes physical education and sports. Therefore, the issue of systematics is acute independent classes of students in their free time from studying. Self-study of students in physical exercises should be aimed at strengthening health, increasing work capacity, mastering skills and skills, improvement of professional activity, formation of social activity and consciousness.

Keywords: educational system, physical education, Self-study of students, social activity and consciousness.

RESUMO

A otimização do processo de educação física como atividade pedagógica especializada, intencional e de gestão exige a procura de novas abordagens à atividade física dos estudantes de instituições de ensino superior da Ucrânia. Recentemente, o seu nível de saúde e aptidão física é motivo de preocupação. A impossibilidade de cumprir as normas de controlo e de módulo de acordo com o programa de educação física para uma avaliação positiva reduz a motivação dos estudantes para as aulas de educação física e desporto. Por isso, a questão da sistemática é aguda nas aulas independentes dos alunos no seu tempo livre de estudo. O auto-estudo dos alunos em exercícios físicos deve ter como objetivo o fortalecimento da saúde, o aumento da capacidade de trabalho, o domínio de competências e habilidades, a melhoria da atividade profissional, a formação da atividade social e da consciência.

Palavras-chave: sistema educativo, educação física, auto-estudo dos estudantes, atividade social e consciência.

Introduction

Physical education of students of higher educational institutions is a component education and upbringing, as well as one of the important means of versatile and harmonious development of student youth.

Today, there is often a non-serious attitude among students personal physical fitness, state of health. About 50% of students of higher educational institutions have deviations in health and physical condition development and physical fitness. Most of them, having passed the physical test education, in the future do not use the means of physical education. Self-study of students in physical education should be aimed at strengthening health, increasing work capacity, mastering skills and skills, improvement of professional activity, formation of social activity and consciousness.

Of great importance for the successful mastery of educational material, raising the standard of living has the correct organization of work and rest, a healthy lifestyle, which includes physical exercises giving up many bad habits.

Students need to organize independent training sessions to provide certain knowledge and skills and methodical advice. This is what the article is for the main theoretical provisions and methodological principles of construction are given training sessions.

Strength is the ability to overcome external resistance or counteract it with the help of muscular efforts. For example, the weight of objects, sports equipment can act as a resistance; partner's resistance; environmental resistance; reaction of the support when interacting with it; Earth's gravitational forces, which are equal to the mass of the human body, etc. The greater the resistance, the more force is needed to overcome it.

When performing one or another motor action, human muscles can perform four main types of work: retaining, overcoming, yielding and combined.

Holding work is performed as a result of muscle tension without changing its length, for example, holding a barbell with straight arms (isometric tension mode).

Overcoming work is performed as a result of reducing the length of the muscle when it is stressed (myometric mode of stress). It provides an opportunity to move one's own body or a load in appropriate movements, as well as to overcome the forces of friction or elastic resistance.

Progressive work is performed as a result of increasing the length of the stressed muscle (polyometric mode of stress). Thanks to the compliant work of the muscles, amortization occurs at the moment, for example, landing in jumps, running.

Most often, muscles perform combined work, which consists of alternately changing overpowering and yielding work modes, for example, in cyclic physical exercises.

"Explosive strength" is a person's ability to exert large amounts of force in the shortest amount of time. It has a very significant importance in a number of high-speed and powerful actions, for example, at the start of a sprint, in jumping, throwing, striking actions in boxing, etc.

Depending on the mode of operation of the muscles, static (when the muscles are tense, and there is no movement of the body, its links or objects with which a person interacts) and dynamic (when overcoming resistance is accompanied by the movement of the body or its individual links in space) are distinguished.

Dynamometers of various designs are used for quantitative assessment of strength abilities (hand and standing dynamometers), as well as strength exercises with weights (lifting barbells, kettlebells).

Comprehensive indicators of external manifestations of strength abilities are determined on the basis of a set of special control exercises and appropriate tests that take place in the physical education program of schoolchildren, for example, high and long jumps, throwing a grenade and a ball, pull-ups, etc.

So, the main factor in the manifestation of strength is muscle tension. At the same time, not the last role is played by the weight of the human body. In this regard, absolute muscle strength and relative strength are distinguished.

Absolute strength is assessed by overcoming the maximum weight object weight (barbells) or by dynamometer readings.

Relative strength is evaluated according to the same parameters, but based on 1 kg of one's own body weight.

In some sports (such as throwing) success is ensured by great absolute strength, in those sports where weight gain is limited to weight classes or where the body must be moved repeatedly (for example, performing a combination on a gymnastic apparatus), success is ensured by relative strength.

The article analyzes modern sources in the direction of research, such authors as Vuust, P., & Witek, M. A. G. (2014) - Research on rhythmic complexity and predictive coding in music. The authors use a new approach to model the perception of rhythm and meter in music. Dvir, D., Raz, T., & Shenhar, A. J. (2003) - An empirical analysis of the relationship between project planning and project success. The study examines the impact of project planning on its success. Slavich, M. A., Dwyer, B., & Rufer, L. (2018) - The influence of sport event factors on spectator satisfaction. The article examines how factors of sporting events influence spectator satisfaction. O'Reilly, N. J., & Nadeau, J. P. (2006) - Income Generation in Professional Sport: A Diagnostic Analysis. The study analyzes ways of generating income in professional sports. Thomson, A., Schlenker, K., & Schulenkorf, N. (2013) - Conceptualizing a sporting event as a legacy. The article considers the concept of inheritance in the context of sports events. Barney, J. (1991) - Firm resources and sustainable competitive advantage. The article examines the role of company resources in maintaining competitive advantage. Kraaijenbrink, J., Spender, J. C., & Groen, A. J. (2009) - A review and critique of the resource-based approach. The article considers

the resource-oriented approach in management. Hansen, H., & Gauthier, R. (1989) - Factors affecting attendance at professional sporting events. The study examines the factors that influence attendance at sporting events. Barni, D., Danioni, F., & Benevene, P. (2019) - The influence of personal values and motivation on teachers' self-efficacy. The study examines the influence of personal values and motivation on teachers' belief in their own learning capabilities. Borle, P., Reichel, K., Niebuhr, F., & Voelter-Mahlknecht, S. (2021) - Effects of technology stressors on mental health and work performance. A systematic review of the responsibility of the impact of technological stress factors on work results and mental health of employees.

The purpose of the article is to present the main theoretical provisions and methodical principles of building training classes.

Materials and methods

Research methods:

- theoretical (analysis, synthesis, interpretation, modeling);
- practical (participant observation, peer review, questioning, free interviews, marketing research methods);
- methods of mathematical statistics.

Research methods: theoretical: study and analysis of pedagogical, psychological, philosophical, sociological literature on the problem of research, legislative and regulatory documents; systematization, classification, terminological analysis, pedagogical modeling, retrospective analysis, generalization of existing pedagogical experience; empirical: pedagogical experiment; diagnostic methods (testing, conversation, observation, questioning, self-assessment, self-analysis, mutual assessment), professional activity motivation methodology, pedagogical interpretation of the research results.

Discussion

The progressive development of a person's strength qualities occurs up to 25-30 years of age and is characterized by heterochrony. This means that some age periods are characterized by low rates of development of strength qualities, while others are characterized by high rates. So, for example, the general development of muscle strength until the age of 9-10 years in girls and up to the age of 10-11 years in boys is insignificant. The age period from 9-10 to 16-17 years is characterized by the highest growth rates of absolute muscle strength. In the future, the growth rate of strength gradually slows down.

The highest rates of increase in absolute strength, according to the indicators of the nine main groups of skeletal muscles in both women and men, occur in the age periods from 10-11, from 12-14 and from 15 to 17 years.

By the age of 10-11, the values of the annual increase in absolute strength of girls and boys are almost the same. And starting from the age of 12, girls' muscle strength grows more slowly than boys'. After 6 years, in all subsequent age periods, the strength of the muscles of the arms and trunk is significantly greater in boys than in girls.

The age dynamics of relative strength has a slightly different character. Thus, the relative strength of 10-11-year-old girls reaches the indicators of adult women.

Having an idea about the essence of power abilities, you can adequately choose the appropriate means for their development. Strength exercises are considered to be those, the performance of which requires a greater amount of muscle tension than under normal conditions of their functioning. As the main means, physical exercises with weights are used, which purposefully stimulate an increase in the degree of muscle tension.

According to the features of weights, the entire variety of strength exercises is divided into the following groups:

Exercises with the weight of your own body (pull-ups, push-ups, squats, jumps, etc.).

Exercises with the weight of objects (barbell, kettlebells, dumbbells, stuffed balls, etc.).

Exercises with weighted resistance (resistance of elastic objects, resistance of a partner, resistance of the environment, self-resistance, etc.).

Exercises with combined weights (pull-ups, jumps, etc., with additional weight on your own body).

Exercises on strength simulators.

Isometric exercises.

The following components of the methodology must be observed when starting independent strength training classes:

The purpose of the lesson.

Duration of classes (number of weeks).

The number of classes in a weekly cycle.

Know your own repetition maximum (RM) for each specific strength exercise.

What should be the burden (in %) from the maximum result, taking into account the purpose of the lesson.

The number of repetitions in one approach.

Number of approaches (series).

Nature and rest interval between approaches and series.

Strength development tips and injury prevention tips.

Before performing strength exercises, it is necessary to warm up well and keep the body warm during the entire session.

Increasing the size of weights and the total volume of strength loads should be done gradually, especially at the initial stages of strength training.

The selection of new exercises for strength development should be carried out through good assimilation of their technique with a careful determination of the amount of weights.

At the initial stages of strength training, the development of all skeletal muscles should be carried out harmoniously.

You should not hold your breath while performing strength exercises with unlimited weights.

To reduce the load on the spine, you should use a special weightlifting belt, and in the rest intervals between strength exercises, perform squats.

In order to avoid spine injuries, it is necessary to systematically strengthen the abdominal and trunk muscles.

The straight position of the spine is the most comfortable when performing exercises that act on it.

You should know that the greatest mobility in the knee joints, when performing squats with weights, is provided by a comfortable starting position of the feet.

To prevent overstraining the cardiovascular system, do not take a deep breath before straining. The most optimal half-breath should be 60-70% of a deep breath.

Stretching exercises should be performed in the rest intervals between strength exercises. The amplitude of movements should be 10-12% less than the maximum in the corresponding joint.

If you feel pain or tingling in the muscles, ligaments, tendons or joints, you should stop the exercise immediately.

Method. Body endurance is important when running. General and special endurance are distinguished. General endurance is understood as the body's ability to perform long-term, high-efficiency work of moderate intensity. Special endurance is the ability to perform long-term loads characteristic of a specific type of activity. To develop endurance, various training methods are used, which are divided into continuous and interval training methods.

The uniform continuous method consists in one-time uniform performance of exercises of low and moderate power lasting from 15-30 minutes and up to 1-3 hours.

This method develops aerobic abilities.

The variable continuous method is characterized by a periodic change in the intensity of continuously performed work. At the same time, the body works in a

mixed aerobic-anaerobic mode. The method allows you to develop the ability the body can withstand hypoxic conditions that periodically occur during acceleration and are eliminated when the intensity is reduced. In particular, this method contributes to the education of strong-willed qualities.

The interval method consists in dosed, repeatedly performed exercises of mostly short duration through clearly defined rest intervals. This method is used to develop specific endurance for a specific defined work and to develop both anaerobic and aerobic components of endurance.

Methodology of independent training classes.

Methodical principles that must be followed when conducting independent training sessions, resulting from: consciousness and activity, systematicity, accessibility and individualization, dynamism and gradualness. The principle of consciousness and activity presupposes an in-depth study of the theories and methods of sports training, a conscious attitude to the training process, an understanding of the purpose and tasks of training sessions, the rational use of means and methods of training in each session, accounting for the volume and intensity of performed exercises and physical exertion, the ability to analyze and evaluate the results of training sessions. Self-study should be not only conscious, but also active. Students must show initiative and creativity in planning lessons, selecting and using modern means and methods of sports training.

The principle of systematicity requires the continuity of the training process, the rational alternation of physical exertion and rest in one session, the continuity of the sequence of training loads from session to session. Episodic classes or classes with longer breaks (more than 4-5 days) are ineffective and lead to a decrease in the level of fitness achieved. The principle of accessibility and individualization obliges to plan and include in each training session physical exercises, in terms of their complexity and intensity, available for the performance of those who are engaged in. When determining the content of training sessions, it is necessary to follow the rules: from simple to complex, from easy to difficult, from known to unknown, as well as to carry out a strict accounting of the individual characteristics of those engaged in: gender, age, physical fitness, level of health, willpower, hard work, type

of higher nervous activity, etc.; the selection of exercises, volume and intensity of training loads should be carried out in accordance with the strengths and capabilities of their body.

The principle of dynamism and gradualness determines the need to increase the requirements for those who do it, use new, more complex physical exercises, and increase training loads in terms of volume and intensity. The transition to higher training loads should take place gradually, taking into account the functional capabilities and individual characteristics of the exerciser. The increase in training loads can be linear-ascending jump-like, step-like or wave-like. The use of one or another type depends on the purpose and tasks of the classes for the current period, as well as on the individual characteristics of the participants. A gradual increase in load is typical for one session, for a weekly and annual cycle, and for multi-year training. Ignoring the principle of gradualness, accelerated, forced preparation do not contribute to achieving the planned results, can be harmful to health. If you were interrupted in the training classes due to illness, then you should start the classes after the permission of the doctor, strictly observing the principle of gradualness. Initially, training loads are significantly reduced and gradually brought to the level planned in the training plan. All the above principles are closely related. These are different sides of a single, holistic process of increasing the functional capabilities of those who are involved.

General and special physical training are distinguished. General physical training consists in the harmonious development of all physical qualities: strength, speed of movements (speed), coordination of movements (dexterity), flexibility, endurance.

Education of strength. Strength (or strength abilities) is the ability of a person to overcome external resistance or counteract it with the help of muscle tension. Strength as a physical quality is characterized by the degree of muscle tension or contraction. Strength development is accompanied by thickening and formation of new muscle fibers. By developing the mass of different muscle groups, you can change the body configuration (physique). Means of strength training are: gymnastic exercises with weights (the weight of one's own body or its individual

parts is used as a weight - bending and straightening of arms in stops, pull-ups on the crossbar, tilting and straightening of the body, squatting, etc.), various jumps; special strength exercises with small weights (dumbbells, expanders, rubber shock absorbers, light weights, light barbell); special strength exercises with heavier loads (weights, barbell, etc.). The following methods of strength training are most common.

The method of maximum effort is characterized by performing exercises with the use of limit weights (90% of the record for this athlete). Each exercise is performed in series. In one series (with one approach to the projectile), 1-3 repetitions are performed. 5-6 series are performed in one session. Rest between sets is 4-8 minutes. (before restoration). The maximum dynamic force is mainly developed when using this method.

The method of repeated efforts (or the method "to failure") involves exercises with a load of 30-70% of the record, which are performed in series of up to 4-12 repetitions in one approach. 3-6 sets are performed in one session. Rest between sets - 2-4 minutes. (until incomplete recovery). With this method, there is an effective increase in muscle mass.

The method of dynamic efforts is associated with the use of small and medium weights (up to 30% of the record, so that the technique of movements is not distorted). Exercises are performed in series of 15-25 repetitions for one approach at the fastest possible pace. 3-6 series are performed in one session. Rest between sets 2-4 min. With the help of this method, speed and strength qualities are mainly developed.

The isometric (static) method assumes static maximum tension of various muscle groups lasting 4-6 seconds. During one session, the exercise is repeated 3-5 times with a 30-60 s rest after each tension. This method mainly develops strength, which is most evident during static work.

A strong "muscular corset" contributes to the normal functioning of internal organs and has a positive effect on a person's health.

Strength develops relatively slowly when engaged in tourism. Therefore, it should be developed with special training. However, you should not get carried

away with lifting heavy objects. It is more appropriate to use medium weights, but with a large number of repetitions. In this case, muscle endurance will also develop.

Exercises with shells of different weights should be included in one workout. Exercises with light objects should be performed until fatigue, then, after a little rest, repeat them again. Exercises with overcoming one's own weight (pull-ups, squats, straightening arms in a lying position) are performed until failure. Strength exercises are performed throughout the training period.

Conclusions

In the basis of the technology of training students to of independent physical exercises lies in the interconnection of all components of the educational process in compliance with the defined goal, tasks, principles, methods, means, forms and stages of education.

The technology of preparing students for independent physical exercises involves a hierarchical sequence of the main stages: fostering a positive attitude and interest of students in physical exercises, forming a system of scientific and practical and special knowledge necessary for independent physical exercises, forming relevant abilities and skills, involving students in systematic physical exercises. The main mechanisms of pedagogical guidance in the process of preparing students for independent physical exercises are students' understanding of the need for systematic physical exercises; reflective self-analysis by the student of indicators of physical condition, potential opportunities for achieving the best result; overcoming psychological obstacles by means of creative activity.

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